Name:

at1119paper: Complete the Square, b = odd (v516)

Example

By completing the square, find both solutions to the given equation:

$$x^2 - 39x = -270$$

Add $\left(\frac{-39}{2}\right)^2$, which equals $\frac{1521}{4}$, to both sides of the equation.

$$x^2 - 39x + \frac{1521}{4} = \frac{441}{4}$$

Factor the left side.

$$\left(x + \frac{-39}{2}\right)^2 = \frac{441}{4}$$

Undo the squaring.

$$x + \frac{-39}{2} = \frac{-21}{2} \quad \text{or} \quad x + \frac{-39}{2} = \frac{21}{2}$$
$$x = \frac{39 - 21}{2} \quad \text{or} \quad x = \frac{39 + 21}{2}$$
$$x = 9 \quad \text{or} \quad x = 30$$

Question 1

By completing the square, find both solutions to the given equation:

$$x^2 + 7x = 294$$

$$x^2 + 7x + \frac{49}{4} = \frac{1225}{4}$$
$$\left(x + \frac{7}{2}\right)^2 = \frac{1225}{4}$$

$$x + \frac{7}{2} = \frac{-35}{2} \quad \text{or} \quad x + \frac{7}{2} = \frac{35}{2}$$
$$x = \frac{-7 - 35}{2} \quad \text{or} \quad x = \frac{-7 + 35}{2}$$
$$x = -21 \quad \text{or} \quad x = 14$$

Question 2

By completing the square, find both solutions to the given equation:

$$x^2 + 59x = -868$$

$$x^2 + 59x + \frac{3481}{4} = \frac{9}{4}$$

$$\left(x + \frac{59}{2}\right)^2 = \frac{9}{4}$$

$$x + \frac{59}{2} = \frac{-3}{2} \quad \text{or} \quad x + \frac{59}{2} = \frac{3}{2}$$

$$x = \frac{-59 - 3}{2} \quad \text{or} \quad x = \frac{-59 + 3}{2}$$

$$x = -31 \quad \text{or} \quad x = -28$$

Question 3

By completing the square, find both solutions to the given equation:

$$x^2 + 47x = 1898$$

$$x^2 + 47x + \frac{2209}{4} = \frac{9801}{4}$$

$$\left(x + \frac{47}{2}\right)^2 = \frac{9801}{4}$$

$$x + \frac{47}{2} = \frac{-99}{2} \quad \text{or} \quad x + \frac{47}{2} = \frac{99}{2}$$

$$x = \frac{-47 - 99}{2} \quad \text{or} \quad x = \frac{-47 + 99}{2}$$

$$x = -73 \quad \text{or} \quad x = 26$$